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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,080	12/22/2005	Haruhiko Deguchi	64702 (70904)	9653
21874 7590 01/24/2008 EDWARDS ANGELL PALMER & DODGE LLP P.O. BOX 55874 BOSTON, MA 02205			EXAMINER STEVENOSKY, MARK J	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 01/24/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/562,080

Applicant(s)

DEGUCHI ET AL.

Examiner

Mark John Stevenosky, Jr.

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 22-51 is/are pending in the application.
- 4a) Of the above claim(s) 1-17, 29, 34-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-28, 30-33, 40-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's arguments have been considered but are moot based on new grounds of rejection based on amendment.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims **18-20,22-27,40-49** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gue et al. in view of Radke (US 6,054,011)

Regarding **claim 18**, Gue discloses the following:

- a first nozzle layer (26) having a first nozzle hole (24) through which liquid substance is discharged
- a second nozzle layer (23) having a second nozzle hole (32) that is connected to the first nozzle hole (24) and receives the liquid substance
- a discharge layer (25) that has an opening (24) and has a higher resistance to etching [polycrystalline silicon; 0101-0103], the discharge layer being provided on a liquid substance discharging side of the first nozzle layer [As seen in Figure 12, layer 25 is located centrally with

relation to the liquid discharge port. Considering the right portion of the layer 26, the layer 25 is located on the left side of the layer, thus it is located on the liquid discharging side of the layer].

Although polycrystalline silicon isn't specifically disclosed as having a high etching resistance, it is well known in the art that the material is resistant to etching, thus it would have been obvious to one of ordinary skill in the art at the time of invention as doing so would provide increased durability of the nozzle plate.

Gue fails to explicitly disclose "in a liquid substance flow direction" and "the opening determining a diameter of the discharge opening"

However, Radke teaches a metal layer [gold layer; 16] bonded to a discharge layer [14] both above and below which defines a diameter of the discharge hole [Figure 1].

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Gue with the invention of Radke, as doing so would prevent delamination of the printhead.

Regarding **claim 19**, Gue discloses the discharge layer being formed in the first nozzle layer [Figure 12].

Regarding **claim 20**, Gue discloses the discharge layer being made of an inorganic material [0101-0103].

Regarding **claim 22**, Gue discloses a discharge layer formed locally around the opening [Figure 12].

Regarding **claim 23**, Gue discloses a blocking layer (22) formed between first (26) and second (23) nozzle layers which has a high resistance to etching [formed of SiO_2 [0099] which applicant lists as having high resistance to etching] and the first nozzle hole penetrates the blocking layer and is connected to the second nozzle hole [Figure 12]

Regarding **claim 24**, Gue discloses a blocking layer having a higher resistance to etching than the second nozzle layer [0099] and an outer shape of the blocking layer is larger than the second nozzle layer [Figure 12] and connect via hole 24 and channel 32.

Regarding **claim 25**, Gue discloses a first nozzle of high resistance to etching as compared to a second nozzle layer [0104;0111].

Regarding **claim 26**, Gue discloses a generally taper shaped first nozzle layer [Figure 12].

Regarding **claim 27**, Gue discloses a generally taper shaped second nozzle layer [Figure 12].

Regarding **claims 40-42**, since claim 18 is an apparatus claim, the method of making does not distinguish one apparatus of the other.

Regarding **claims 43 and 44 and 45**, Gue discloses a cylindrical shaped (28) opening and a taper shaped opening (32) [Figure 12] and the first opening being concentric with a second opening and diameter being smaller than the second opening.

Regarding **claim 46**, Gue discloses the discharge layer and first nozzle being adjacent [Figure 12].

Regarding **claim 47**, Gue discloses an upper base 27 which is substantially circular [Figure 12].

Regarding **claim 48**, Gue discloses the discharge layer being adjacent to the first nozzle layer [Figure 12].

Regarding **claim 49**, Gue discloses the discharge layer formed in the first nozzle layer [Figure 12].

3. Claims **28,50,51** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gue et al. in view of Noguchi et al. (US 2001/0017639).

Regarding **claims 28,50,51**, Gue fails to disclose a water repellant layer. However, Noguchi teaches a liquid repellant film formed on the outer portion of a nozzle [Figure 7]. Thus, it would have been obvious to one of ordinary skill in the art to modify the invention of Gue with the film of Noguchi, as doing so would improve liquid repellency and maintain the liquid repelling effect [Noguchi, abstract].

4. Claims **30-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gue et al in view of Agarwal (US 6,290,331).

Regarding claims 30-33, Gue fails to disclose the claimed limitations.

However, Agarwal teaches layers in a printhead formed of silicon nitride, silicon dioxide, boron nitride, silicon carbide, silicon carbon dioxide, chromium, nickel, rhodium, palladium, gold, titanium, tantalum, aluminum, as well as a plurality of organic substances [Column 11]. Agarwal also teaches the selection of any given

composition(s) for this purpose shall typically be undertaken in accordance with routine preliminary pilot testing taking into account the desired goals to be achieved and then matching a given composition with such goals. Thus, it would have been obvious to one of ordinary skill in the art, through routine testing and experimentation, to combine the invention of Gue with the compositions of Agarwal, as doing so would provide high efficiency orifice plate structure [Agarwal].

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark John Stevenosky, Jr. whose telephone number is

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(571) 270-1336. The examiner can normally be reached on Monday - Friday, 9AM - 5:30PM EST.

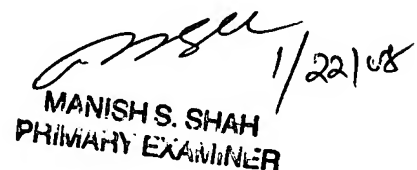
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



1/22/2008

Mark John Stevenosky, Jr.
Examiner
Art Unit 2853



1/22/08
MANISH S. SHAH
PRIMARY EXAMINER